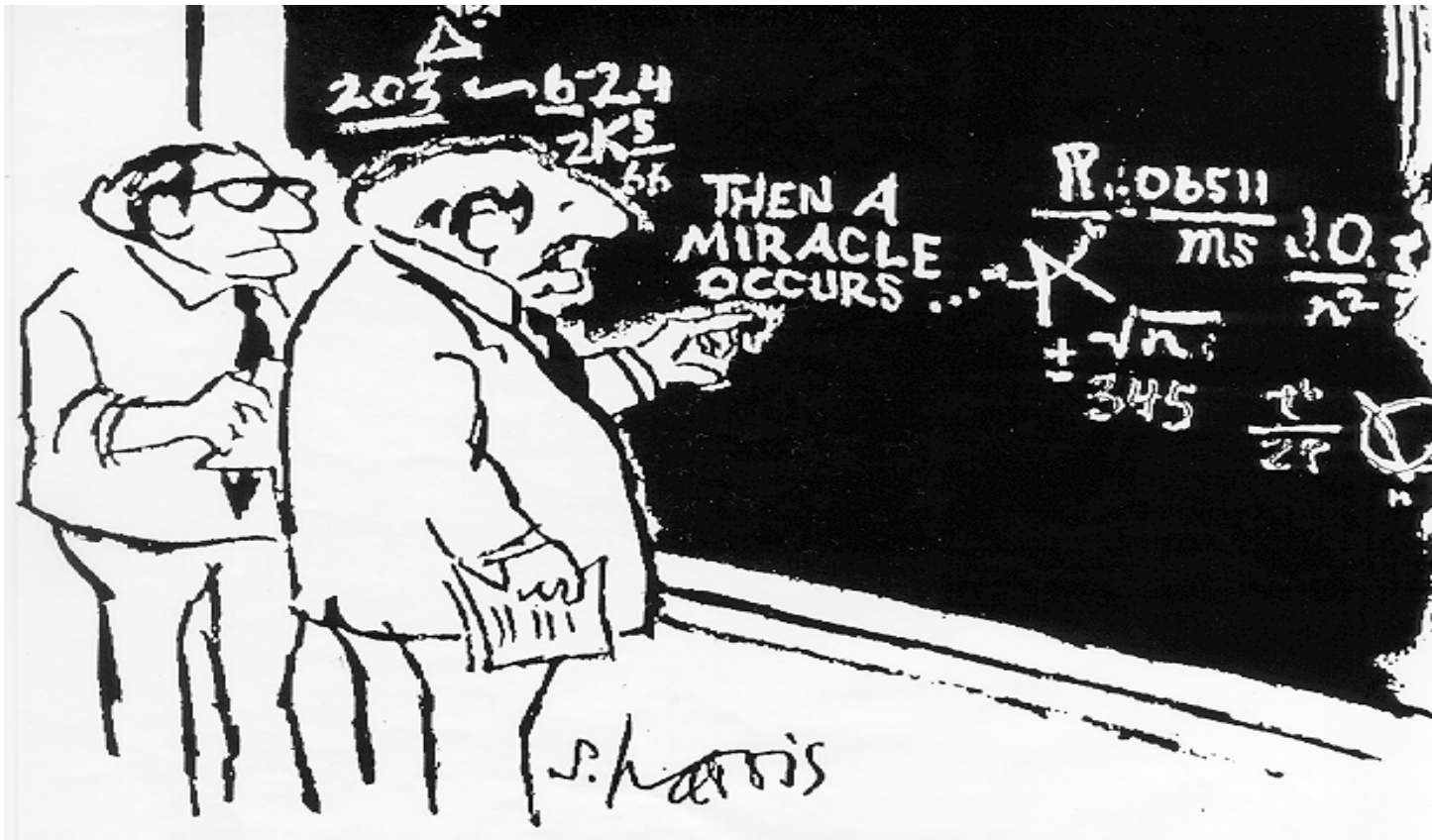




Sandia National Laboratories

Lean Thinking & Kaizen Events

What is the Method of Choice for Process Improvement?



“I think you should be more explicit here in step two.”



Lean & Six Sigma - Definition

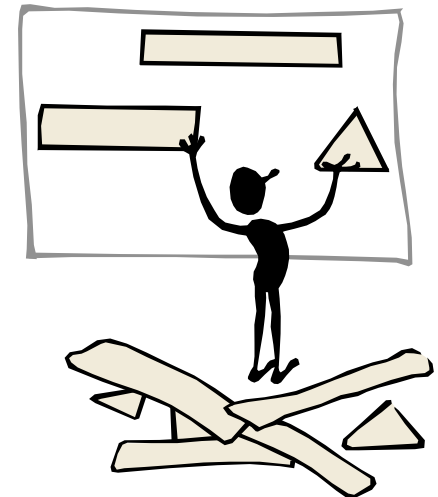
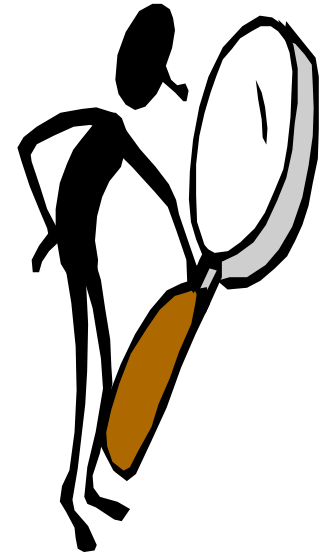
Lean & Six Sigma are methodologies of process improvement focused on:

- Reducing process waste
- Improving performance
- Delivering value to the customer

Applying Lean-Six Sigma methods....

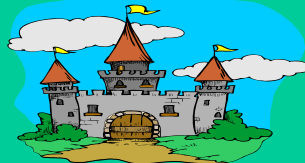
- ◆ Understand how we do work currently
- ◆ Identify opportunities for improvement
- ◆ Uncover opportunities for business changes
 - ◆ Bolster our arguments for change
- ◆ Provide the tools needed to create new processes
- ◆ Support us in implementing the changes needed to make new or improved processes real

Goal: Increase our Efficiencies



Task: Reduce Costs

**Operating Excellence
& Productivity**



Smart Path

Stupid Path



**Cut
Services**



Cut Waste

Lazy Path



Just Cut

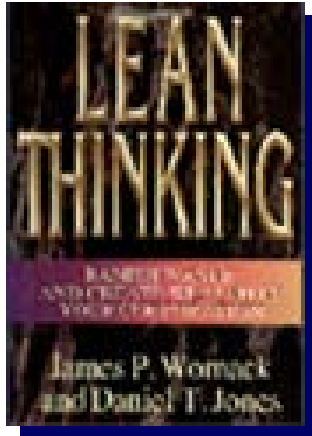
LM21: Lean Processes that Operate at Six Sigma Capability



LM21 - Operating Excellence

Lean processes that operate at Six sigma capability.

Principles:



- ***Value from the Customers perspective***

- ***Value Stream – measured***

- ***Flow***

- ***Pull***

- ***Perfection***





The Importance of Capability

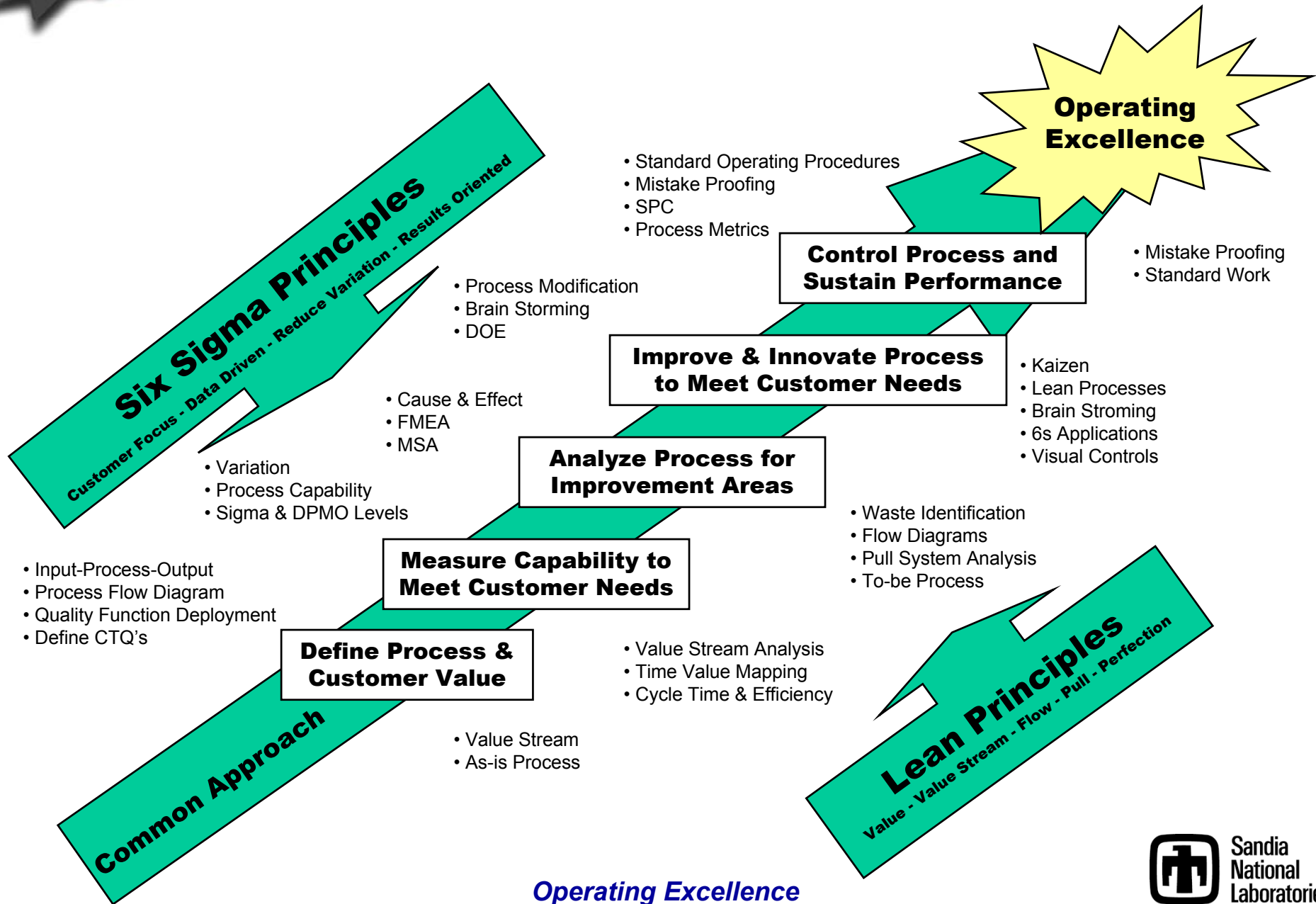
The Ability of a Process to Meet Specifications (Customer Expectations) is Defined as Capability

Being only "99.9% sure" would result in ...

- ◆ 20,000 wrong drug prescriptions a year
- ◆ 107 incorrect medical procedures a day
- ◆ 18,322 pieces of mishandled mail an hour
- ◆ 2,000,000 documents lost by IRS a year
- ◆ Unsafe Drinking Water for 15 Minutes Each Day.
- ◆ Two short or long landings at any major airport each day



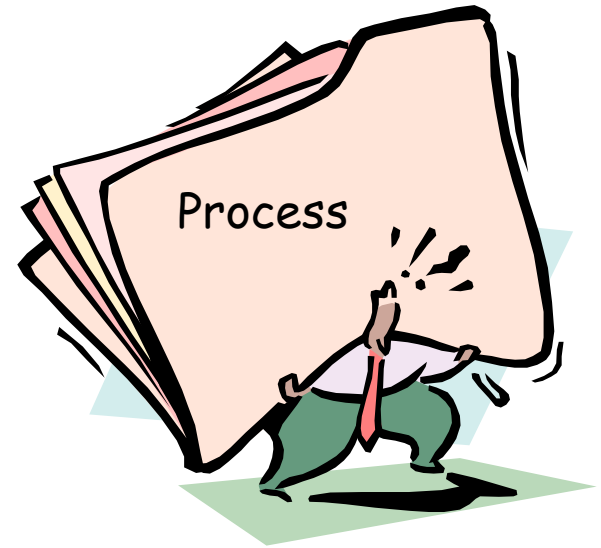
Lean & Six Sigma as a Common Methodology



Lean/Six Sigma Process Improvement Approach Step 1

♦ Value Stream Analysis

- ♦ Map an overall process at the 50,000 ft level
- ♦ Understand the breadth of the process and the real issues causing problems with an aim of providing you with a living planning tool
- ♦ Map Current State, Ideal State, Future State (what is achievable in 6 - 12 mos)
- ♦ Identify and Prioritize the Action Items needed to reach the future state: Just Do Its, Kaizen Events, Projects
- ♦ Typically done with a team of 10 - 12 people for 3 - 4 days (**FULL TIME**)



Where are the
real problems?

Why use a Value Stream Analysis?

- ♦ A Value Stream Analysis:
 - ♦ Is the first step in determining where the most important waste and variability is in your process
 - ♦ Provides a map of your current state at the 50,000 ft level
 - ♦ Identifies sources of waste
 - ♦ Sees the future
 - ♦ Identifies the Actions (Kaizens / Projects, etc.) that need to be taken to reach this future state / process
 - ♦ Helps you to communicate in a common language
 - ♦ Plans actions
 - ♦ **Builds a Case for Change**



Value Stream Analysis Is a Focusing Tool



What is Kaizen?

A Definition:

"KAI" - Take Apart and Make Anew

"ZEN" - Think, Make Good the Actions of Others, Do Good Deeds and Help Others

Kaizen - Make People's Jobs Easier by Taking Apart, Studying, and Making Improvements

Kaizen = Continuous Improvement

Lean/Six Sigma Process Improvement Approach

Step 2

♦ Kaizen Events

- ♦ Map a portion of the Value Stream in much more detail to look at the problem areas
- ♦ Analyze the information with a number of lean and six sigma tools
- ♦ Make real changes that week and measure the impact
 - ♦ Changes can be extended to 30 days. However, beyond that, the actions should be placed in a parking lot.
- ♦ Typically conducted with a team of 10 - 12 people for 4 days (full time)



Successful applications of Lean-Six Sigma at Sandia

- ◆ NG Production
 - ◆ 10 different events
 - ◆ 9 Black Belts + 1 full time Black Belt to coordinate all future events
- ◆ Corporate
 - ◆ 1 Black Belt
 - ◆ NWSBU Budget
 - ◆ Clearance Process
 - ◆ Agile People Deployment
- ◆ Finance / Procurement
 - ◆ 14 different events / \$675K in savings
 - ◆ 2 Black Belts / 1 in training
- ◆ CA
 - ◆ High rigor NELA process event
 - ◆ Plans to apply this to all medium to high rigor processes
- ◆ Engineering Support / Design
 - ◆ Production Drawing Release System event
 - ◆ Design to Analysis Process
 - ◆ W80 Design Qualification Process



The baton is being passed

MC4277 Frame Assembly Rapid Improvement Event



Team members examine defect data

Objective

- ♦ Reduce defects by 50 percent. (Improve)
- ♦ Examine major contributors to Processed Frame defects
- ♦ Establish appropriate tracking. (Control)

Approach

- ♦ Kaizen Event

Results

- ✓ Reduced defects by 56 percent
- ✓ Projected Yield improvement from 66 to 85 percent
- ✓ Significant improvement in cycle time
- ✓ Projected cost avoidance of \$6100 per work order are expected when yield reaches 85%

Savings

- ✓ Projected cost avoidance of \$1M when yields reach 85%

MC4277 Tube Exhaust Cycle Time Reduction

Exhaust Bake Station #3



Objective

- ♦ Reduce Cycle Time By 33%
- ♦ Decrease Cycle Time At tube Exhaust From 3 days to 2 days
- ♦ Reduce waste, e.g. operator/hardware travel, idle time, over processing

Approach

- ♦ Kaizen Event

Results

- ✓ Reduced Tube Cycle Time by 38 percent
- ✓ Two Runs/Equipment/Week
- ✓ Time: 2.5 hrs/tubes ➔ 1.75 hrs/tubes
- ✓ Increased output from 8 tubes / week to 16 tubes / week

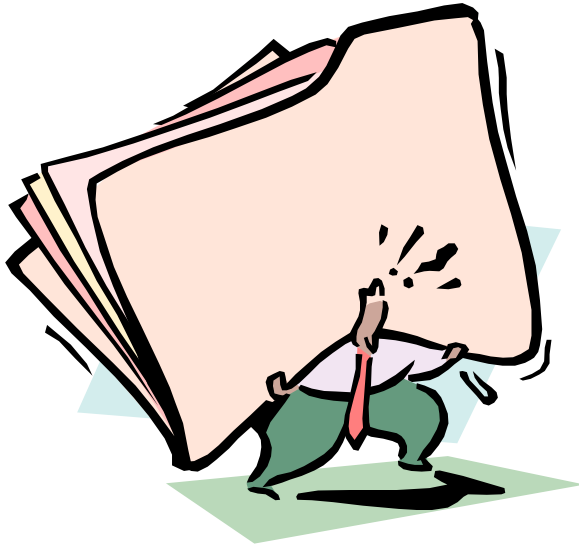
Long Term

- ✓ Reduce Tube Cycle Time by 44 percent
- ✓ Three Runs/Equipment/Week
- ✓ Labor Resource Decrease

Savings

- ✓ Eliminated \$13,000 in overtime
- ✓ Increased Productivity by 100%

Purchase Order Invoicing Rapid Improvement Event



Objective

- Decrease cost per transaction from \$7 to \$5
 - this translates into savings of **\$28,000 / mo.**
- Increase accuracy of payments to suppliers
 - From 75% to better than 90%

Approach

- ♦ Value Stream Analysis followed by a Kaizen Event

Results

- ✓ Defined an electronic invoicing process
- ✓ Cost per invoice reduced from \$7 / invoice to \$5 or less / invoice
- ✓ Eliminated overtime by eliminating 3-day backlog
- ✓ Improved accuracy to better than 90%
- ✓ Other changes are still being implemented to further improve this process

Savings

- ✓ **Result: \$336K cost avoidance**
 - ✓ Based on a decrease in overtime resulting in a decrease in cost per transaction to \$5

WFO - Non Federal Entity Rapid Improvement Event



Objective

- ♦ Standardize proposal processes and reduce cycle time from initiation to \$ to the line

Approach

- ♦ Value Stream Analysis followed by a Kaizen Event

Results

- ✓ Defined a web-based process
- ✓ Span reduced from 71 to 14 days in house
- ✓ Cycle time reduced by 43%
- ✓ Decreased rework by 80%
- ✓ Handoffs reduced from >100 to 7
- ✓ Cost reduced from \$2800/proposal to \$502/proposal

Savings

- ✓ Potential for \$351K per year (based on 153 proposals per year)
 - ✓ When web-based solution is implemented
- ✓ Improved customer's ease of doing business by 50%

Governance Value Stream Analysis in Procurement



Objective

- ♦ To create new processes for Sandia's Acquisition Process in accordance with the principals of governance.

Approach

- ♦ Value Stream Analysis

Results

- ✓ Determined that over 80% of the "governance" constraints were self-imposed
- ✓ Reduced total process time by 64%
- ✓ Reduced the number of approvals from between 6 and 15 to 0
- ✓ Reduced no. of process steps by 50%
- ✓ Reduced no. of handoffs by 65%

Savings

- ✓ Potential savings of up to 50% based on process step reduction alone.
- ✓ Reduction in the no. of "governance" constraints by 83%



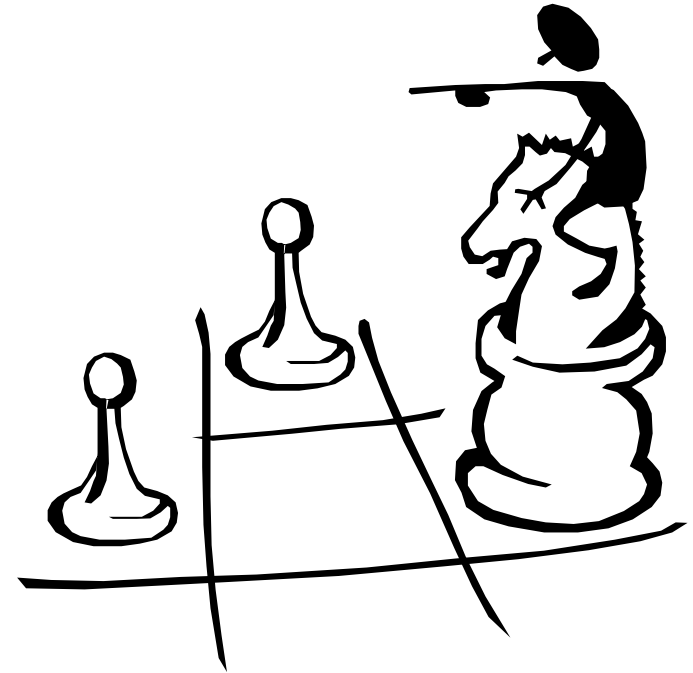
What's Different from Other Quality Initiatives?

- ◆ Big differences
 - ◆ With Lean / Six sigma, we are actually implementing change and not just analyzing the problems to death
 - ◆ We are targeting getting rid of the waste and variability
 - ◆ Can be applied to any process
 - ◆ If you do work, you have a process



How do you begin? Contact us

- ◆ Site Points of Contact
 - ◆ LM21 POC Ron Detry, Director 9800
284 - 3191
 - ◆ LM21 Program Lead for Corporate / non-manufacturing
Kim Mitchiner, 9800 844 - 2222
- ◆ Manufacturing Black Belt Support Team led by Cindy Longenbaugh
- ◆ Non-Manufacturing Black Belt Support Team led by Kim Mitchiner
- ◆ Non-Manufacturing Green Belt Support Team led by Nora Armijo



Training

- ♦ What type of training should you be considering?
 - ♦ Black Belt Training (1% of your population):
 - ♦ Waves start every 2 months
 - ♦ We typically have 2 or more slots
 - ♦ Black Belts are trained to run the VSA's and the Kaizen events, do statistical analysis of data to identify problem areas, and conduct projects
 - ♦ They are expected to work as BB's 50% (initially) moving to 30% of their time
 - ♦ Some Black Belts will become full time
 - ♦ Green Belts are trained to facilitate VSA's, help BB's facilitate the Kaizen events, and conduct projects
 - ♦ There are no expectations on how much time they need to dedicate
 - ♦ One Day Training for all staff





Q & A Session

